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(54) IMPROVEMENTS TO VARIABLE POSTURE APPARATUS

(71) I, PETER ARNOLD UPMAN, 5 St. Ives Wood, Ringwood, Hants BH24 2EA (formerly of 4th Floor, Durham House, 124 Old Christchurch Road, Bournemouth, Dorset), British, do hereby declare

the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention relates to variable posture apparatus in which an upper supporting frame for a person, which may comprise of a single or a multiple of sections, adapted to take up different angles relative to a chassis. It is often desirable, when such an apparatus is used as a bed, that the section supporting the body draws rearwards to close proximity of the headboard during posture change, and that the apparatus may be substantially counter-balanced during this movement.

The object of the invention is therefore to provide an improved apparatus of this kind.

The type of apparatus to which the present invention relates comprises a chassis; an upper supporting frame for a person which may comprise a single first section or a multiple of up to preferably three transversely hinged sections; and posture control means interconnecting the said supporting frame and the chassis such that; in a first construction, a first control means interconnects a single first section with the chassis, the section being of suitable length to support the trunk only or the whole of the body or; in a second construction a second control means interconnects first and second hinged sections with the chassis, the said sections being adapted to support the trunk and the remainder of the body respectively, it being understood that the section may be optionally made of a suitable length to support the thighs only or; in a third construction, third control means interconnects first, second and third hinged sections with the chassis, the said sections being adapted to support the trunk, thighs and legs respectively; the apparatus also optionally incorporating first, second and third additional posture control means by which any of the said relevant sections of any of the said constructions may be adjusted individually, or in combination with each other independently of the operation of the first, second and third control means, the arrangement being that any of the said sections in a given construction may be adjusted from a first configuration in which each section is co-planar and parallel, or co-planar and angularly related to the chassis, to further configurations in which the said sections are adapted to take up different angles relative to each other and to the chassis; and further means being optionally incorporated to provide for posture locking, variable height facility and balanced tilting. Such an apparatus is referred to hereafter as an 'apparatus of the kind described herein'.

According to the present invention there is provided an apparatus of the kind described herein in which the posture control is derived from at least a first control means having a linkage comprising wholly or in part a first pair of swinging legs interconnecting a first or only section and a chassis, the control means also comprising a rocker link having two free ends with one such free end being attached directly or interconnected by a link to a pivotally connecting point on the linkage or the chassis, and a link interconnecting the other free end with either the linkage or the first or only section through up to three intermediate links. The said first control means may be so constructed so as to enable one given extremity of the first section to remain generally close to a vertical plane during rotation of said section and may also be substantially counter-balanced during said rotation. A first additional posture control means may be interposed between the said first control means and the first section in order to allow further adjustment of said section.

The posture control means may further comprise a second control means which may include wholly or in part any given first control means, interconnecting first and second hinged sections with a first pair of swinging legs and the chassis. This last said control means is adapted to allow rotation of both the said sections to be co-ordinated such that the weight on the first section is substantially counter-balanced by the weight on the second section during posture change, the said control means also enabling the end of the first section remote to the second section to remain generally close to a vertical plane during said posture change. Second additional posture control means may also be optionally interposed between the second control means and the first and second sections in order to allow further adjustment of said sections.

The apparatus posture control means may further comprise third control means interconnecting first, second and third hinged sections with the chassis. The third control means comprises first and second parts linked by a connecting strut and takes any one of the following forms of which; in a first form the first part consists of any one given first or second control means linked by the said connecting strut to a second operating element associated with a second pair of swinging legs; and in a second form the first part consists of a first operating element associated with a first pair of swinging legs connected by the connecting strut to a second operating element associated with a second pair of swinging legs, the two said elements being dependent upon each other to form a free standing construction. A third additional posture control means may be interposed between the third control means and the said sections to permit further adjustment.

It will be understood that the additional posture control means comprises the connecting strut being of releasable locked adjustable length, and a first end of said strut being pivotally attached to any suitable point of the said first or second sections, links, or legs of the first control means.

Articulation of the apparatus may be achieved by the use of body weight of the occupant or manually by an attendant. Alternatively known manual or powered articulation means (not shown) may be employed between any two relatively moving points of the apparatus.

Apparatus posture locking means in one given embodiment of the third construction comprises a canted plate locking mechanism slideably engaged with the connection strut, in this case being round tube or rod, a housing of the locking mechanism being pivotally interconnected by a locking stay to a suitable point of the first part of the third control means. An apertured plate is freely mounted within the said housing with the said connecting strut passing freely through the plate aperture, one end of the plate projecting through an associated opening in the housing. A fork, comprising a collar at one end, is interposed between the plate and the housing, the collar freely encircling an end of the plate remote to the said associated opening in the housing, and the plate, fork and housing being so adapted that with the collar end of the fork urged in one axial direction the plate is canted on the connecting strut, one edge of the associated opening forming a stop in one axial direction, and the collar portion of the fork, in conjunction with an abutment of the housing, forming a stop in a reverse axial direction, thus causing the plate and the housing to become frictionally locked with the connecting strut. With the fork urged in an opposed axial direction the plate is constrained to be square to the connecting strut which thus releases the locking mechanism and allowing it to slide freely along the said strut. Known means employing bowden cable and conduit may be linked between the fork and the housing and a suitable point on the apparatus to urge the fork. The fork is urged to release the plate by a strong spring positioned between the fork and the locking mechanism housing.

It will be understood that known means (not shown) of locking the apparatus may be incorporated between any two relatively moving points of the apparatus. The apparatus may incorporate a variable height facility in which the chassis may comprise two spaced parallel side members each of which being adapted at, or in proximity to, the ends of which to slideably receive vertically disposed mounting pillars, each end pair of which being named for convenience the first and second pairs. The extremities of each pillar of the first pair of pillars are harnessed to a first loop of cable intermediate the ends of which being incorporated a portion of chain, there being one loop for each pillar. Each of the said first loops of cable and chain then pass over suitably disposed pulleys and a sprocket rotatably mounted in each chassis side member, and the said loop of cable being tightly arranged over said pulleys and sprocket. The extremities of each pillar of the second pair of pillars are also harnessed in like manner to the first pair, but by a plain loop of cable in this case. Each of the said first and second loops of cable associated with each side member of the chassis are operably linked by a reversible pawl device which, in a given engaged position, causes both loops to be linked at points above the centre line of the pulleys and sprockets which, when each pawl is moved along the

associated chassis side member by hydraulic piston and cylinder means, causes one end pair of pillars to rise and the other pair of pillars to lower through the bush mountings thus resulting in a tilting of the apparatus. A reversed movement of the pawl reverses the tilt. When the pawl device is in a reversed engaged position the upper portion of the second pair of pillars are linked to the lower portion of the first pair of pillars which, when the pawl is moved in a given direction along the length of the chassis side members, causes each pair of pillars to rise or fall, according to the direction of the movement of the pawl, in synchronism thus causing the apparatus to rise or fall correspondingly.

It will be understood that the apparatus may also be mounted on other known means (not shown) for variable height adjustment.

The apparatus may also incorporate transport means comprising wheels, which may be brakeable and directionally locked.

The following is a description by way of example only of one given embodiment of, and further embodiments, of the invention with reference to the accompanying drawings in which:—

Figure 1 is a side elevation of a basic embodiment of the third construction with both the third section and chassis side members cut short.

Figure 2 is a side elevation of a basic embodiment of the third construction in an articulated position.

Figure 3 is a sectional view of a canted plate locking mechanism.

Figure 4 is a sectional view of a variable height mechanism.

Figures 5-7 show alternative embodiments of the first construction.

Figures 8-11 show alternative embodiments of the second construction.

Figure 12 shows an alternative embodiment of the second construction comprising any one given first construction.

Figures 13-15 show alternative embodiments of the third control first operating element included in the third construction.

Figures 16-21 show alternative embodiments of the third control second operating element included in the third construction.

Figures 22-26 show alternative embodiments of the third control second operating element included in combination with any one given second control means.

Figure 27 shows a side elevation of first additional posture control means.

The drawings will be now referred to in more detail. To avoid the repetition of descriptions of numerous parts of the apparatus which are of similar construction the following conventions will be used. Where link, strut, legs and the like are named it will be understood, unless otherwise specified, that they will be preferably of spaced parallel construction, the pivotal axis of which being transverse to the longitudinal axis of the apparatus. Where sections, frames and the like are named they will be preferably of a generally rectangular construction having rigid sides and end members including any rigid extension thereof. All extensions named will extend in a plane vertical and parallel to the longitudinal axis of the apparatus.

It will be understood that, to achieve first, second and third additional posture control means, any link, strut, will be of adjustable length. By the use of the said additional posture control means sections may be adjusted individually or in combination with each other and the chassis.

Starting now with Figure 1 a basic type of the improved apparatus according to the third construction includes an upper supporting frame comprising transversely hinged sections 1, 2, 3 hinged at 4, 5; sections 1, 3 each incorporating rigid extensions 28, 31. Swinging legs 10 pivotally interconnect points 6, 11 intermediate the ends of section 1 and chassis side members 12. Vertically disposed tube mountings 29 are rigid with, or in close proximity to, the ends of chassis side members 12. These tube mountings 29 may receive mounting feet, wheels or variable height pillars as described later. Angled rocker link 14 is pivotally attached by its fulcrum to a point 19 intermediate the ends of chassis side members 12; one end 20 of the rocker link 14 being pivotally interconnected by link 13 to a point 27 intermediate the ends of swinging legs 10; and the remaining free end 15 of rocker link 14 being pivotally interconnected by link 16 to a point 7 intermediate the ends of section 1 in proximity to hinge 4. Ends 8, 24 of extensions 28, 31 are pivotally interconnected by connecting strut 23. The said strut 23, in this embodiment, is of round tube. Swinging legs 25 pivotally interconnect points 9, 26 intermediate the ends of section 3 and chassis side members 12.

Locking stay 30 pivotally interconnects locking mechanism housing 22 and end 18 of extension 17 rigid with rocker link 14. Locking mechanism housing 22 is slideably engaged along connecting strut 23.

Referring to Figure 3 the locking mechanism comprises a channel shaped housing 47 rigid with an apertured platform 34, the two said parts also being rigid with a bearing tube 32 aligned along a centre axis of the mechanism and adapted to be slideably engaged along strut 23. The said tube 32 also comprises a transverse pivot mounting 33 for an optional operating arm (not shown). The locking mechanism housing 47 incorporates a transverse rectangular

opening indicated generally at 48 which freely receives an end of an apertured plate 37, one transverse edge of the said opening 48 also being adapted to act as a stop 35; platform 34 also comprises an abutment forming a stop 36 diametrically opposite and facing an opposed axial direction to the first said stop 35. Fork 38 comprising side pieces 39 is positioned to bestride strut 23 and is interposed between apertured plate 37 and both platform 34 and stop 36; rigid with fork 38 rectangular shaped collar 40 is positioned around an associated end of apertured plate 37 and is adapted to constrain said end of plate in one of two opposed axial directions along the centre line of the mechanism; side projections 42, rigid with collar 40 extend transversely to the side pieces 39 and are slideably engaged in slots 41 formed in locking mechanism housing 47, said slots being parallel to the centre line of the locking mechanism 47; extension 43 of fork 38 is adapted to take one end of a releasing cable 49, and an associated extension 44 of platform 34 is adapted to hold one end of a conduit 50, and through which said cable 49 is able to pass; spring 45 is interposed between fork extension 43 and platform extension 44 such that pressure is exerted on apertured plate 37 by means of collar 40 of fork 38; light spring 46 maintains pressure on an associated end of plate 37 to ensure contact of apertured plate 37 with the associated stop 35.

Cable 49 connected to an operating handle (not shown) with conduit 50 fixed to an associated bracket exerts axial pressure when operated on fork 38 which then pivots on side projections 42 which then slides off stop 36 to become square to platform 34, this also constrains apertured plate 37 to be square to the said platform 34 by means of collar 40 thus releasing apertured plate 37 from frictional engagement with connecting strut 23. Pressure from spring 45 between fork and platform extension 43, 44 causes fork 38 to cant relative to platform 34 and consequently to connecting strut 23 thus nudging apertured plate 38 into canted frictional engagement with strut 23, stops 35, 36 prevent movement of locking mechanism housing 47.

Referring to Figure 4 the variable height mounting means comprises end pairs of pillars 56, 57 of sliding fit in vertically disposed bush mountings 29 rigid with, or in close proximity to, each end of chassis side members 12, said side members being shown broken away at 53, 54. Close to each bush mounting 29 is positioned a pair of plain pulleys 61, adjacent to each other, and revolving on common pin 62 rigid with associated chassis side member 12 and so arranged that each pulley revolves in a plane adjacent to a plane in line with the centre lines of end pillars 56, 57. Sprockets 63, shown in dotted outline, are rigid with cross shaft 67 extending between and journalled in chassis side members 12. Plain pulleys 64 revolve freely on extensions of cross shaft 67 projecting from each sprocket 63. Upper and lower extremities 59, 51 of end pillars 57 are attached to free ends of loops of cable 65, one loop to each end pillar 57, intermediate the ends of said cable loop 65 there being inserted a length of chain 66, and each of said cable loops 65 being adapted to pass from upper attachment points 59 of pillar 57, along grooves 60 (formed longitudinally in each pillar 57 and in line with a given plain pulley 61) and along the underside of plain pulley 61. Intermediate chain portion 66 meshes with sprocket 63 as shown and the remaining portion of cable loop 65 then passes round the upper side of the adjacent plain pulley 61 and down along a second groove 60 formed in like manner to the first said groove to the lower extremity 51 of pillar 57. Rotation of sprockets 63 thus causes synchronous movement of pillars 57 through bushes 29. Extremities 59, 51 of end pillars 61 are each harnessed in like manner as described for end pillars 57 by a loop of plain cable 58, the intermediate portion of said plain cable 58 passing over plain pulley 64 (shown in dotted outline in the drawing). Each cable loop 58 has a pivot mounting 73 secured to it and adapted to form a traversing pivot along track 55, said track 55 being a fixed part of both chassis side members 12. Each said pivot 73 forms a pivot for a reversible acting pawl 68, one pawl 68 being associated with each cable loop 58 and chassis side member 12, and being rigid with each other by cross arm 69 extending between chassis side members 12. One given end of cross arm 69 is pivotally attached to an end of hydraulic piston 70, the associated cylinder of which being pivotally attached to a point 72 intermediate the ends of a given chassis side member 12. The said reversible acting pawls 68 are selectively engaged with said chain 66 in the simplest manner by a radially extending lever 52 rigid with cross arm 69 so that angular movement of lever 52 in the direction of, say, end pillars 56 causes engagement of pawl 68 with the upper portion of chain 66, and a reversed movement causes engagement of pawl 68 with the lower portion of chain 66. When pawl 68 is engaged with the upper portion of chain 66 (as shown in the drawing) matched extremities 59, 51 of end pillars 57, 56 are linked together and rotation of sprocket 63 by the traversing of pawl 68, acted on by hydraulic piston and cylinder 70, 71 when operated by known means (not

shown) will cause vertical movement of end pillars 57, 56 in opposite directions to each other and thus cause tilting of the apparatus. Engagement of pawl 68 with the lower portion of chain 66 reverse the extremities of end pillars 57, 56 linked together and rotation of sprocket 63 as described before causes syncronous movement of both end pillars 57, 56 to be in the same direction and thus raise or lower the apparatus.

The following figures include a number of common components and attachment points which, after a first definition, will be referred to by number only and, where needed for clarity reasons, an abbreviated definition. All attachment or connection points will be understood to be pivoting, unless otherwise specified.

In Figure 5 the first control means as shown in Figure 1 is repeated to make clear it may be employed as an equal alternative to Figures 6, 7 as a first control means. Rigid extension 17 of rocker link 14 is shown as an optional feature as also is rigid extension 28 of section 1.

In Figure 6 rocker link 14 is pivotally attached by its fulcrum to a point 27 intermediate the ends of swinging legs 10, one free end 76 of said link 14 being pivotally interconnected by link 77 to a point 79 intermediate the ends of supporting link 78. Link 16 pivotally interconnects free end 80 of supporting link 78 to a point 7 adjacent hinge 4 and intermediate the ends of section 1. The remaining free end 74 of rocker link 14 is pivotally interconnected by link 75 to a point 19 intermediate the ends of chassis side members 12.

In Figure 7 fulcrum 81 of rocker link 14 is interconnected by link 75 to point 19, a first free end of said link 14 being attached to point 27, and a remaining free end 82 being interconnected by link 77 to point 79.

Additional first posture control means comprise any links, or struts being of adjustable length. It will be understood that alternative attachment points for a first end of strut 23 (shown in Figure 1), when a first control means comprises part of a third control means, may be to any one given link, strut, leg or member as required to achieve a given additional adjustment.

In Figure 9 rocker link 14 is attached by its fulcrum to point 27, one free end 74 being connected by link 75 to point 19, and free end 76 being connected by link 87 to end 83 of section 2 rigid extension 86. A first free end of link 79 is attached to point 19 and a second free end 80 is attached intermediate the ends of link 87.

In Figure 10 fulcrum of rocker link 14 is pivotally attached to end 80 of supporting link 79, one free end 76 of which being connected by link 88 to point 27, the other free end of which being attached to end 83.

In Figure 11 spaced legs 10 and supporting link 79 connect rocker link 14 at 89, 80 to points 11, 19. A first free end 76 of said link 14 being connected by link 88 to point 6, and a second free end being connected to end 83.

In Figure 12 upper ends 90 of second pair of swinging legs 25 are slideably engaged with sides of section 2 at 92. Second free end of connecting strut 23 is attached at 91 to legs 25, and lower ends of said legs 25 are attached at 26 intermediate the ends of chassis side members 12.

Second additional posture control means allowing further adjustment of height and angular movement of sections 1, 2 is achieved by making any link, or strut of releasing lockable adjustable length. By this means sections 1, 2 may be maintained co-planar but angularly related to the chassis, or angularly related to each other and to the chassis.

In Figure 13 rocker link 14 is slideably engaged, at a point 93, intermediate its own ends, with swinging legs 10 at 100, one free end of link 14 being attached at 94 to rigid perpendicular extension 95 of chassis side members 12, the other free end 99 of link 14 being connected by link 96 to end 97 of connecting strut 23 extension 98. Extension 28 to section 1 has end 8 attached intermediate the ends of said strut 23.

In Figure 14 rocker link 14 is pivotally attached by its fulcrum to point 27, one free end 74 being pivotally connected by link 101 to point 94, the other free end 96' being connected by link 96 to end 97 of connecting strut 23. End 83 of section 2 extension 86 is attached intermediate the ends of connecting strut 23.

In Figure 15 fulcrum of rocker link 14 is pivotally attached as in Figure 5, an upper free end of said link being connected at 15 to point 7 by two short connected links 102, 103. Link 96 connects extension end 97 to any one of a plurality of pivot points 104' intermediate the ends of link 103.

In Figure 16 perpendicular extension 105 integral with section 3 is slideably engaged by free end 106 with members 12 at 107. Connecting strut 23 is attached by end 24 intermediate the ends of said extension 105.

In Figure 17 section 2 incorporates rigid extension 108, end 110 of which forming a pivot for rocker link 109, one free end of said rocker link 109 being attached to end 24 of strut 24, the other free end 111 being pivotally attached to upper free ends of swinging legs 25 which are also slideably engaged with sides of section 3 at 92.

In Figure 18 crossed links 113, 114 connect extension 112 of section 3 at 114', 24 and points 115, 116 on legs 25, the lower

free end of which being connected to point 26. Strut 23 is connected to point 24.

In Figure 19 crossed links 117, 118 connect section 3 and strut 23 by spaced points 5,9 and 119, 24 respectively.

In Figure 20 link 120 connects point 5 with end 24 of strut 23, link 121 connects end 24 with point 122 intermediate the ends of section 3, the said link 121 being adjustable in length by known means (not shown).

In Figure 21 depending link 120 connects point 9 with pivot point 119 intermediate the ends of strut 23, and link 121 connects end 24 of strut 23 with point intermediate the ends of section 3. Swinging legs 25 connect section 3 with chassis side members 12.

In Figure 22 rocker link 109 is attached by its fulcrum to point 123 intermediate the ends of section 3 rigid extension 112, free end 119 of said extension 112 being attached intermediate the ends of strut 23, free end 24 of said strut 23 being connected by link 125 to free end 124 of rocker link 109, free end 115 of said link 109 being connected to upper end of swinging legs 25 which are pivoted at their lower ends to chassis side members 12.

In Figure 23 rocker link 109 is attached by its fulcrum to end 115 of swinging legs 25, one free end 126 being connected by link 120 to point 9, the other free end 124 being connected by link 125 to end 24 which is also connected by link 121 to point 122.

In Figure 24 fulcrum of rocker link 109 is connected by link 127 to upper end 115 of legs 25, one free end being connected by link 120 to, or adjacent, hinge 5, the other free end being attached to end 24 of connecting strut 2, end 24 also being connected by link 121 to point 122.

In Figure 25 the fulcrum of rocker link 109 is connected to end 119 of extension 112, one free end being connected to upper end 115 of legs 25, the other free end being connected to end 24 of connecting strut 23.

In Figure 26 spaced links 132, 130 connect section 2 extension 129 at 133, 134 to legs 25 at 131, 135, end 135 of legs 25 also being slideably engaged with the sides of section 3.

In Figure 27 secondary rocker link 136 is connected by its fulcrum to end 138 of link 16, one free end of said rocker link 136 being connected to section 1 at 7, the other free being connected at 137 to connecting strut 23. Releasable angular locking means (not shown) is indicated by dotted lines.

WHAT I CLAIM IS:

1. Apparatus of the kind described herein in which the posture control is derived from at least a first control means having a linkage comprising wholly or in part a first pair of swinging legs interconnecting a first or only section and a chassis, the control means also comprising a rocker link having two free ends with one such free end being attached directly or interconnected by a link to a pivotally connecting point on the linkage or the chassis, and a link interconnecting the other free end with either the linkage or the first or only section through up to three intermediate links.

2. Apparatus as claimed in claim 1 in which a fulcrum of the rocker link is either pivotally attached to the swinging legs, or the chassis, or pivotally connected to the chassis by a link.

3. Apparatus as claimed in claim 2 in which a first free end of the rocker link is either pivotally attached to the swinging legs, or the chassis, or an extension of the chassis.

4. Apparatus as claimed in claim 3 in which a remaining free end, or an intermediate point of the rocker link is pivotally connected to the chassis by articulating links.

5. Apparatus as claimed in claim 1 in which the rocker link is pivotally attached by one free end to an extension of the chassis and an intermediate point of the rocker link is in sliding engagement with the swinging legs.

6. Apparatus as claimed in any preceding claim in which the linkage comprises a first supporting member which consists of a rigid extension of the swinging legs being pivotally attached to the first section by one free end.

7. Apparatus as claimed in any one of claims 1 to 5 in which the linkage comprises a first supporting member which consists of a link pivotally connecting the first section with the rocker link.

8. Apparatus as claimed in any preceding claim in which the linkage comprises a second supporting member, spaced from the first supporting member, which forms part of articulating links pivotally connecting the first section, a remaining free end of the rocker link and the chassis.

9. Apparatus as claimed in any one of claims 1 to 7 in which a second control means comprises a second section hinged to the first section, the said second section being a rigid extension of the second supporting member.

10. Apparatus as claimed in any one of claims 1 to 8 in which a second control means comprises a link pivotally connecting the first pair of swinging legs with a second section hinged to the first section.

11. Apparatus as claimed in either of claims 5 or 6 in which a second control means comprises a second pair of swinging legs interconnecting a second section with the chassis, the upper ends of the said

swinging legs being in slideable engagement with the said second section, and the lower ends of which being pivotally attached to the chassis, the said pair of swinging legs being interconnected by a connecting strut to any suitable point of the first control means.

12. Apparatus as claimed in claim 2 in which a third control means comprising a first operating element consists of a rocker link pivotally attached by a first free end to an extension of the chassis, a point intermediate the ends of the rocker link being slideably engaged with the said first pair of swinging legs, and a remaining free end of the rocker link being pivotally interconnected by a link to a first free end of a connecting strut, the first section being pivotally attached to a point intermediate the ends of the said connecting strut.

13. Apparatus as claimed in claim 4 in which a third control means comprising a first operating element consists of a link pivotally interconnecting a remaining free end of the rocker link with a first free end of a connecting strut which is pivotally attached by a point intermediate its own length to a second section.

14. Apparatus as claimed in any one of claims 1 to 6 in which a third control comprises a second operating element consisting of a perpendicular extension to a third section, a free end of the said extension being slideably engaged with the chassis and the said extension also being pivotally interconnected by a connecting strut to any suitable point of the first control means.

15. Apparatus as claimed in any one of claims 1 to 6, 12, 13 in which a third control means comprises a second operating element operably associated with a second pair of swinging legs pivotally attached by a first free end with the chassis.

16. Apparatus as claimed in claim 15 in which the said second operating element comprises a connecting strut of which a first free end is pivotally attached to any suitable point of the first control means.

17. Apparatus as claimed in claim 16 in which a third section is pivotally attached to a remaining free end of the second pair of swinging legs.

18. Apparatus as claimed in claim 17 in which the second operating element means comprises a link pivotally interconnecting the third section with a second free end of the connecting strut and an adjustable length link interconnecting the said second free end with the third section at a point spaced from the first link.

19. Apparatus as claimed in claim 17 in which the second operating element means comprises a link pivotally interconnecting the third section with a point intermediate the ends of the connecting strut, a second free end of the said connecting strut being pivotally interconnected by an adjustable length link with the third section.

20. Apparatus as claimed in claim 17 in which the second operating element comprises crossed links interconnecting the third section with the connecting strut.

21. Apparatus as claimed in claim 16 in which the second operating element means comprises crossed links pivotally interconnecting the said second pair of swinging legs with the third section, a second free end of the connecting strut being pivotally attached to the third section.

22. Apparatus as claimed in claim 16 in which the second operating element means comprises a pair of parallelogrammic links pivotally interconnecting a second section with the second pair of swinging legs, the upper free ends of the said legs being in slideable engagement with a third section.

23. Apparatus as claimed in any one of claims 7 to 11 in which a third control means comprises a second operating element means.

24. Apparatus as claimed in claim 23 in which the second operating element means comprises a rocker link pivotally attached by its fulcrum to a point intermediate the ends of a third section extension, a free end of the said extension being pivotally attached to a point intermediate the ends of the connecting strut, a second free end of the said strut being pivotally connected by a link to a first free end of the said rocker link, and a second free end of the said rocker link being pivotally attached to an upper free end of the second pair of swinging legs.

25. Apparatus as claimed in claim 23 in which the second operating element means comprises a rocker link pivotally attached by its fulcrum to a third section, a first free end of the said rocker link being pivotally attached to an upper free end of the second pair of swinging legs, a remaining free end of the said rocker link being pivotally attached to a second free end of the connecting strut.

26. Apparatus as claimed in claim 23 in which the second operating element means comprise a pair of parallelogrammic links pivotally interconnecting a third section with free ends of a rocker link, the fulcrum of which being pivotally interconnected to an upper free end of the second pair of swinging legs by a link, one free end of the rocker link being pivotally attached to a remaining free end of the connecting strut.

27. Apparatus as claimed in any preceding claim in which the posture control means includes a locking means.

28. Apparatus as claimed in any of the preceding claims in which the locking means comprises of a canted plate locking mechanism slideably engaged with a con-

necting strut pivotally interconnecting first and second parts of the third control means, a housing of the said locking mechanism being pivotally interconnected by a locking stay to a suitable point of the first part of the third locking means.

29. An apparatus as claimed in claim 28 in which the said locking mechanism comprises of an apertured plate freely mounted in the said housing, the connecting strut passing freely through the aperture of the plate and one end of the plate projecting through an asscciated opening in the housing.

30. An apparatus as claimed in claim 29 in which the said locking mechanism comprises of a fork, incorporating a collar at one end, interposed between the plate and the housing, the said collar freely encircling an end of the plate remote to the said associated opening in the housing.

31. An apparatus as claimed in claim 30 in which the said plate, fork and housing are so adapted that with the collar end of the fork urged in one axial direction the plate is canted on the connecting strut, one edge of the aforesaid associated opening forming an axial stop in one direction, and the collar portion of the fork lodging against an abutment of the housing forming a stop in an opposed direction, the plate and the housing thus becomes frictionally locked with the connecting strut, and with the said collar portion of the fork being urged in a reverse axial direction, the said plate is constrained to be square with the connecting strut thus releasing the locking mechanism and allowing it to slide along the connecting strut.

32. An apparatus as claimed in any preceding claim in which a variable height means for the chassis comprises of first and second pairs of end pillars slideably received vertically by the chassis.

33. An apparatus as claimed in claim 32 in which the extremities of each pillar of the first pair of end pillars are harnessed to a first loop of cable intermediate the ends of which being incorporated a portion of chain, each of the said first loops of cable and chain passing over suitably disposed pulleys and sprockets rotatably mounted with each chassis side member.

34. An apparatus as claimed in claim 33 in which the extremities of each pillar of the second pair of pillars are harnessed to a second loop of plain cable passing over suitably disposed rotatable mounted pulleys with each chassis side member.

35. An apparatus as claimed in claim 34 in which the said first and second loops of cable are operably linked by a reversible pawl device which, in a given engaged position, links the first and second pairs of looped cables such that the matching extremities of each pair of end pillars are linked together.

36. An apparatus as claimed in claim 35 in which the reversible pawl device in a given second engaged position reverses the linkage between the said first and second loops of cable and thus connects opposed extremities of the first and second pairs of end pillars.

37. An apparatus as claimed in any of the preceding claims in which the apparatus may be mounted on wheels.

38. An improved variable posture apparatus substantially as hereinbefore described and with reference to the accompanying drawings.

PETER ARNOLD UPMAN

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1578141 COMPLETE SPECIFICATION

7 SHEETS *This drawing is a reproduction of the Original on a reduced scale*

Sheet 1

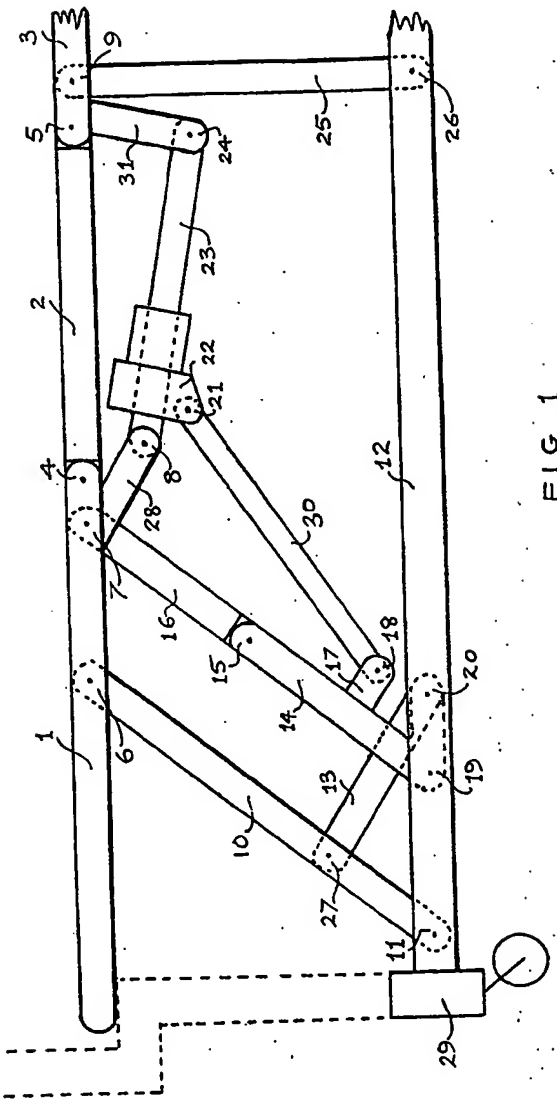

FIG 1

PETER ARNOLD UPMAN
14252/8.4.76
191741/11.5.76
074571-22.2.77

1578141 COMPLETE SPECIFICATION
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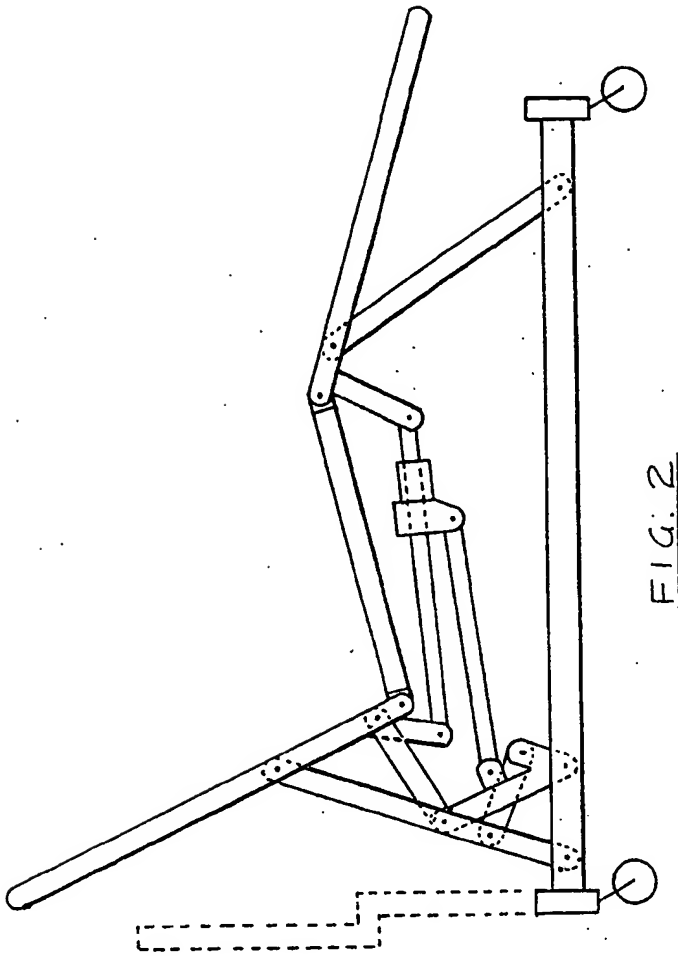

FIG. 2

PETER ARNOLD JAMAN
14552- 8/4/76
19274 - 11/5/76
07451 - 22/2/77

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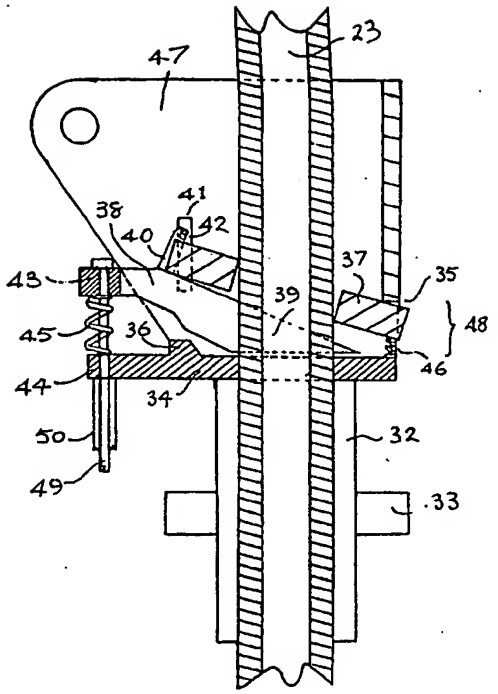

FIG. 3

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Sheet 4

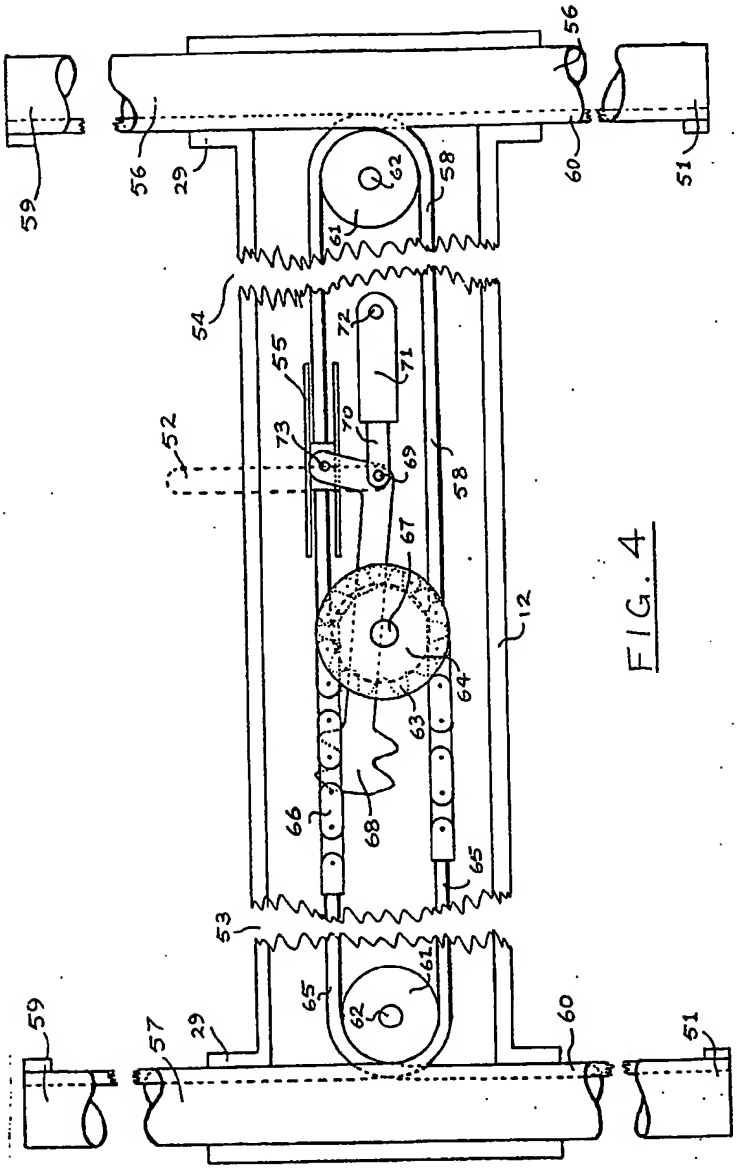

FIG. 4

1578141 COMPLETE SPECIFICATION

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Sheet 5

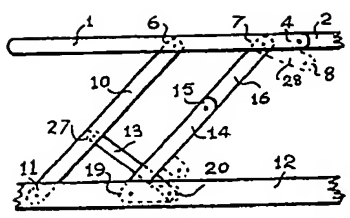

FIG 5

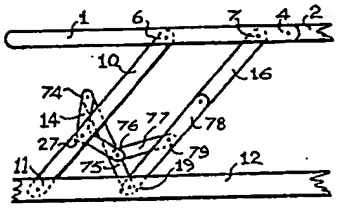

FIG 6

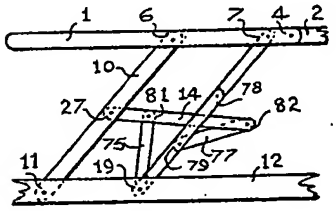

FIG 7

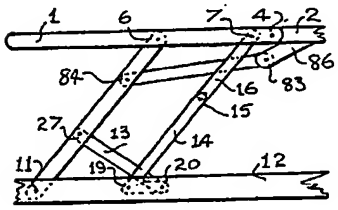

FIG 8

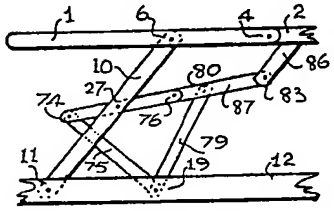

FIG 9

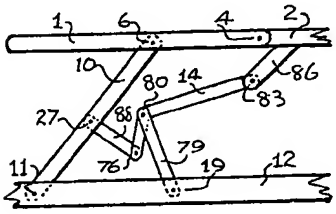

FIG 10

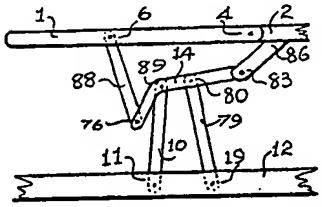

FIG 11

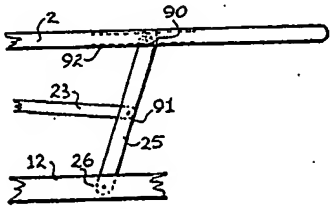

FIG 12

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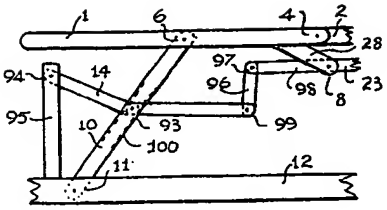

FIG 13

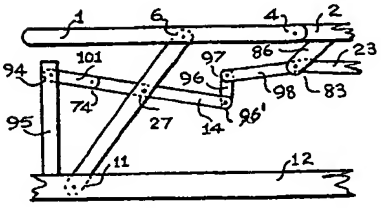

FIG 14

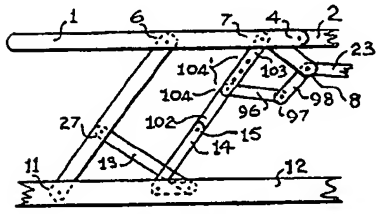

FIG 15

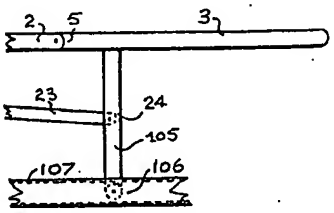

FIG 16

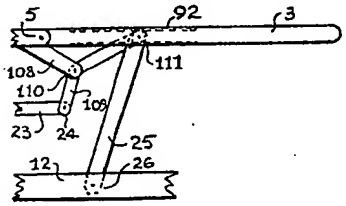

FIG 17

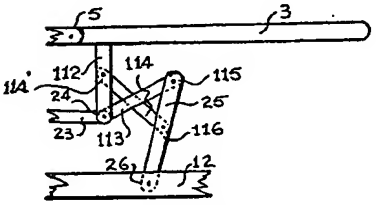

FIG 18

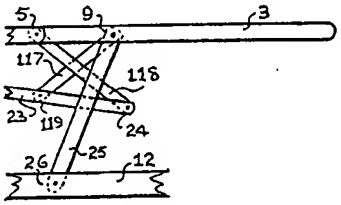

FIG 19

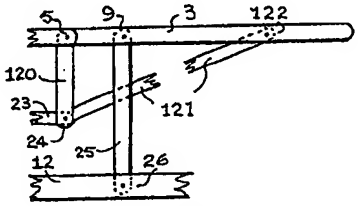

FIG 20

1578141 COMPLETE SPECIFICATION
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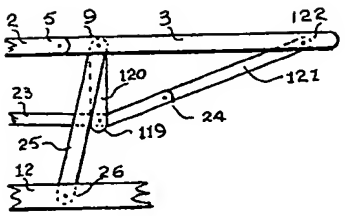

FIG 21

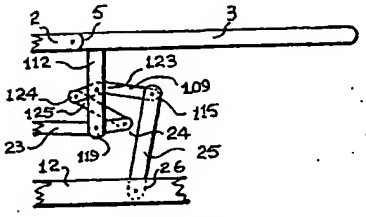

FIG 22

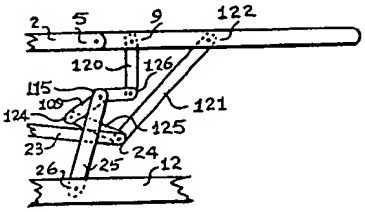

FIG 23

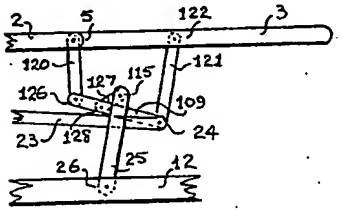

FIG 24

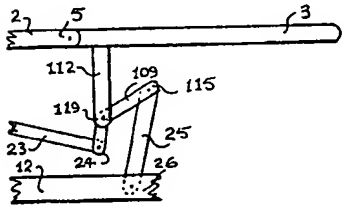

FIG 25

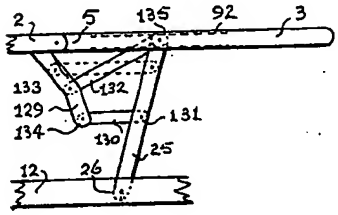

FIG 26

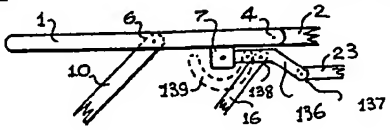

FIG 27